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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,243	10/15/2001	Doron Handelman	HANDELMAN=1A	2683

1444 7590 08/05/2005

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EXAMINER

CURS, NATHAN M

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/976,243	Applicant(s) HANDELMAN ET AL.	
	Examiner Nathan Curs	Art Unit 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Allowability Withdrawn

1. The indicated allowability of claims 4, 8 and 14 is withdrawn in view of the newly discovered reference(s) to Lee et al. and Benhaddou et al. Rejections based on the newly cited reference(s) follow.

Drawings

2. The drawings are objected to because the amendment of 3 February 2005 described corrections to the drawings, but the office received no actual corrected drawings with the amendment. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. ("Lee") (US Patent No. 6288808) in view of Benhaddou et al. ("Benhaddou") ("New multiprotocol WDM/CDMA-based optical switch architecture"; Benhaddou et al.; Simulation Symposium 2001. Proceedings. 34th Annual, 22-26 April 2001, Pages 285-291).

Regarding claims 1 and 9, Lee discloses a method and optical switching apparatus (fig. 3, elements 24 and 25) that switches to a destination route (fig. 3, elements 26 to 30 and right-side output links and subscribers) upstream optical signal samples that are obtained from a first source (fig. 3, left-side input link 1), and upstream optical signal samples that are obtained from additional NCC sources (fig. 3, left-side input links 2 to N and subscribers and col. 3, line 60 to col. 4, line 25) and comprise at least one of the following: upstream optical signal samples that are separately obtained from NS sources (fig. 3, left-side input links 2 to N); and n series of upstream optical signal samples that are separately obtained from n sources and are carried over n discrete channel wavelengths (fig. 3, left-side subscribers and col. 4, lines 38-42), wherein the upstream optical signal samples obtained from said first source are provided at a data rate DRS (fig. 4 and), the upstream optical signal samples obtained from the NS sources are provided at data rates DRSS.sub.j, and each series of upstream optical signal samples in the n series of upstream optical signal samples is carried over a discrete channel wavelength .lambda..sub.i at a data rate DR.sub.i, where each of NCC, n and NS is an integer greater than or equal to one, i is an index running from 1 to n, and j is an index running from 1 to NS (figs. 4

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and 5 and col. 4, lines 26-60), the apparatus comprising: an upstream optical converter unit operative to convert said upstream optical signal samples that are obtained from said first source and said upstream optical signal samples that are obtained from said additional NCC sources into a broadband combined series of upstream optical signal samples at a combined data rate DR.sub.c which is greater than any of the following: DRS; any separate DRSS.sub.j; and any separate DR.sub.i (fig. 3, elements 24 and fig. 4 and col. 4, lines 26-60); and an upstream router operatively associated with the upstream optical converter unit and operative to route said broadband combined series of upstream optical signal samples to said destination route (fig. 3, element 25 and col. 3, line 60 to col. 4, line 25). Lee discloses multiple sources, each sending a multi-wavelength WDM signal from a source to a converter (fig. 3, elements left-side sources 1 to N and fig. 4), but does not disclose that the optical signal samples obtained from the first source are obtained by a spread spectrum technique, or that the upstream optical signal samples that are separately obtained from NS sources are obtained by said spread spectrum technique. However, Benhaddou discloses WDM spread spectrum, where switching the spread spectrum data by allocating the data to fixed period cells and then switching the fixed period cells, using wavelength conversion, and multiplexing the switched data to a single outgoing wavelength, is also anticipated (pages 285-286, sections Abstract, 1 and 2, and page 287, col. 1, lines 3-20). It would have been obvious to one of ordinary skill in the art at the time of the invention that the WDM spread spectrum teaching could be applied to each of several of the multi-wavelength WDM signals from different sources (including NS plus one sources) in the system of Lee, to provide the benefit of increasing bandwidth (allowing multiple users to access bandwidth simultaneously), as taught by Benhaddou.

Regarding claims 2 and 10, the combination of Lee and Benhaddou discloses a method and apparatus according to claims 1 and 9, respectively, and wherein each of said upstream

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optical signal samples obtained from the first source and said upstream optical signal samples obtained from the NS sources comprises upstream optical signal samples that occupy a wavelength band (Lee: col. 3, line 60 to col. 4, line 25 and Benhaddou: page 285, Abstract, where each optical sample of a given WDM wavelength occupies the wavelength band of that WDM wavelength), and said upstream optical converter unit comprises: a multiplexing/demultiplexing unit comprising: a grouped add-drop multiplexer (GADM) which is operative to drop said upstream optical signal samples obtained from the first source (Lee: fig. 4, element 35), and at least one of the following: NS grouped ADMs operative to drop said upstream optical signal samples that are separately obtained from said NS sources (Lee: fig. 3, elements 24-1), and at least one ADM operative to drop the n series of upstream optical signal samples (Lee: fig. 3, elements left-side input Subscribers); an upstream wavelength converter unit operatively associated with the multiplexing/demultiplexing unit (fig. 3, elements 24 and fig. 4) and comprising: a broadband wavelength converter operatively associated with the GADM and operative to convert the upstream optical signal samples obtained from the first source that are dropped by the GADM into a first series of upstream optical signal samples centered around a channel wavelength λ_D (fig. 3, element 24 and fig. 4 and col. 4, lines 26-60), and the following: at least one wavelength converter operative to convert any of the λ_i that differ from λ_D to λ_D thereby forming a group of n series of upstream optical signal samples having the upstream optical signal samples carried over λ_D (fig. 4 and col. 4, lines 26-60); and a combiner operatively associated with the upstream wavelength converter unit and operative to obtain said broadband combined series of upstream optical signal samples by combining the following: all said series of upstream optical signal samples centered around said channel wavelength λ_D , and the n series of upstream optical signal samples in said group (fig. 4, elements 38 to 42 and col. 4, lines 26-60).

Regarding claim 3, the combination of Lee and Benhaddou discloses a method according to claim 2 and also comprising selecting said channel wavelength $\lambda_{sub.D}$ prior to said converting (fig. 4 and col. 4, lines 26-60, where the incoming channels converted to a wavelength to be routed to a destination is a disclosure that the outgoing wavelength is pre-selected).

Regarding claims 4 and 11, the combination of Lee and Benhaddou discloses a method and apparatus according to claims 1 and 9, respectively, and wherein each of said upstream optical signal samples obtained from the first source and said upstream optical signal samples obtained from the NS sources comprises upstream optical signal samples that are randomly spread in a plurality of bands around a plurality of wavelengths (Benhaddou: page 285, Abstract, where optical CDMA used for the WDM signals of NS sources, as described above for claims 1 and 9, would spread the optical signal samples across the wavelength band defined by the WDM spectrum), and said upstream optical converter unit comprises: a multiplexing/demultiplexing unit comprising: a random add-drop multiplexer (RADM) which is operative to drop said upstream optical signal samples obtained from the first source (Lee: fig. 4, element 35), and at least one of the following: NS random ADMs operative to drop said upstream optical signal samples that are separately obtained from said NS sources (Lee: fig. 3, elements 24-1), and at least one ADM operative to drop the n series of upstream optical signal samples (Lee: fig. 3, elements left-side input Subscribers); an upstream wavelength converter unit operatively associated with the multiplexing/demultiplexing unit (fig. 3, elements 24 and fig. 4) and comprising: a broadband wavelength converter operatively associated with the RADM and operative to convert the upstream optical signal samples obtained from the first source that are dropped by the RADM into a first broadband series of upstream optical signal samples (fig. 3, element 24 and fig. 4 and col. 4, lines 26-60), and the following: at least one wavelength

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converter operative to convert any of the $\lambda_{sub.i}$ to a channel wavelength $\lambda_{sub.D}$ thereby forming a group of n series of upstream optical signal samples having the upstream optical signal samples carried over $\lambda_{sub.D}$ (fig. 4 and col. 4, lines 26-60); and a combiner operatively associated with the upstream wavelength converter unit and operative to obtain said broadband combined series of upstream optical signal samples by respectively combining the following: the first broadband series of upstream optical signal samples, the N_S broadband series of upstream optical signal samples, and the n series of upstream optical signal samples in said group (fig. 4, elements 38 to 42 and col. 4, lines 26-60).

Regarding claim 5, the combination of Lee and Benhaddou discloses a method according to claim 1 and wherein said destination route comprises the following: a destination fiber optic cable capable of carrying optical signal samples at said combined data rate $DR_{sub.c}$ (fig. 3, elements 25 and 26, where the wavelength carried between these elements is an optical signal).

Regarding claims 6 and 12, Lee discloses a method and optical switching apparatus (fig. 3, elements 24 and 25) that switches to nn routes (fig. 6, right-side outputs) a broadband series of downstream optical signal samples, where nn is an integer greater than one and the broadband series of downstream optical signal samples is provided at a data rate $DR_{sub.T}$ (col. 4, lines 16-60), the apparatus comprising: a downstream optical converter unit operative to convert the broadband series of downstream optical signal samples into nn series of downstream optical signal samples at data rates $DRT_{sub.1}, \dots, DRT_{sub.nn}$ (fig. 3, element 24 and fig. 4 and col. 4, lines 26-60), the nn series of downstream optical signal samples comprising the following: NT broadband series of downstream optical signal samples and a downstream router operatively associated with the downstream optical converter unit and operative to route said nn series of downstream optical signal samples to the nn routes

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respectively (fig. 6 and col. 4, line 61 to col. 5, line 32). Lee does not disclose that the broadband series of downstream optical signal samples are obtained by utilizing a spread spectrum technique. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the WDM spread spectrum teaching of Benhaddou with Lee as described above for claims 1 and 9.

Regarding claims 7 and 13, the combination of Lee and Benhaddou discloses a method and apparatus according to claims 6 and 12, respectively, and wherein said broadband series of downstream optical signal samples comprises downstream optical signal samples that occupy a wavelength band (Lee: col. 3, line 60 to col. 4, line 25 and Benhaddou: page 285, Abstract, where each optical sample of a given WDM wavelength occupies the wavelength band of that WDM wavelength), and said downstream optical converter unit comprises: a demultiplexer operative to separate said broadband series of downstream optical signal samples into n series of downstream optical signal samples (fig. 3, elements 24-1 and fig. 4) comprising the following: NT broadband series of downstream optical signal samples centered around a channel wavelength λ_T (col. 4, lines 26-60) and a downstream wavelength converter unit operatively associated with the demultiplexer and comprising the following: NT broadband wavelength converters operative to convert the NT broadband series of downstream optical signal samples centered around λ_T into NT broadband series of downstream optical signal samples centered around NT channel wavelengths of which NT-1 channel wavelengths are different from λ_T (fig. 3, elements 24 and col. 4, line 26 to col. 5, line 32); and a multiplexing/demultiplexing unit comprising at least one of the following: NT grouped add-drop multiplexers (GADMs) operative to add said NT broadband series of downstream optical signal samples centered around NT channel wavelengths to NT routes of said n routes respectively (fig. 3, elements 24 and fig. 4 and col. 4, lines 26-60).

Regarding claims 8 and 14, the combination of Lee and Benhaddou discloses a method and apparatus according to claims 6 and 12, respectively, and wherein said broadband series of downstream optical signal samples comprises downstream optical signal samples that are randomly spread in a plurality of bands around a plurality of wavelengths (Benhaddou: page 285, Abstract, where optical CDMA used for the WDM signals of NS sources, as described above for claims 1 and 9, would spread the optical signal samples across the wavelength band defined by the WDM spectrum), and said downstream optical converter unit comprises: a demultiplexer operative to separate said broadband series of downstream optical signal samples into nn series of downstream optical signal samples (fig. 4, elements 24-1 and fig. 4) comprising the following: NT broadband series of downstream optical signal samples (col. 4, lines 26-60); a downstream wavelength converter unit operatively associated with the demultiplexer (fig. 3, elements 24 and fig. 4) and comprising the following: NT broadband wavelength converters operative to convert the NT broadband series of downstream optical signal samples into NT broadband series of downstream optical signal samples randomly spread in a plurality of bands around a plurality of wavelengths (Lee: figs. 3 and 4 and col. 4, line 26 to col. 5, line 32 and Benhaddou: page 285, Abstract); and a multiplexing/demultiplexing unit comprising at least one of the following: NT random add-drop multiplexers (RADMs) operative to add said NT broadband series of downstream optical signal samples randomly spread in a plurality of bands around a plurality of wavelengths to NT routes out of said nn routes respectively (Lee: figs. 3 and 4 and col. 4, line 26 to col. 5, line 32 and Benhaddou: page 285, Abstract).

Regarding claim 15, Lee discloses an optical communication signal useful for communication to at least one of a node server (fig. 3, element 25) and an end node of an optical communication network (fig. 3, right-side elements 1-N and subscribers), the optical

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communication signal comprising a broadband series of optical signal samples having the optical signal samples carried at a data rate $DR_{sub.c}$, the broadband series of optical signal samples being produced by optically converting optical signal samples (fig. 3 and left-side source 1 and fig. 4 and col. 4, lines 26-60), and optical signal samples that are obtained from additional NCC sources (fig. 3, elements left-side sources 2 to N and subscribers) and comprise the following: optical signal samples that are separately obtained from NS out of the NCC sources (fig. 3, elements left-side sources 2 to N); and n series of optical signal samples that are separately obtained from n out of the NCC sources and are carried over n discrete channel wavelengths (fig. 3, elements left-side subscribers and col. 4, lines 38-42, wherein the optical signal samples obtained from said first source are provided at a data rate DR_S , the optical signal samples obtained from the NS sources are provided at data rates $DR_{SS.sub.j}$, and each series of optical signal samples in the n series of optical signal samples has the optical signal samples carried at a data rate $DR_{sub.i}$, where each of NCC, n and NS is an integer greater than or equal to one, i is an index running from 1 to n, and j is an index running from 1 to NS, and $DR_{sub.c}$ is greater than any of the following: DR_S ; any separate $DR_{SS.sub.j}$; and any separate $DR_{sub.i}$ (figs. 4 and 5 and col. 4, lines 26-60). Lee does not disclose that the optical signal samples from the sources are obtained by utilizing a spread spectrum technique. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the WDM spread spectrum teaching of Benhaddou with Lee as described above for claims 1 and 9.

Regarding claim 16, the combination of Lee and Benhaddou discloses a communication network comprising a node server (fig. 3, element 25), a plurality of end nodes (fig. 3, elements right-side destinations 1 to N and subscribers), and a communication switch comprising the

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optical switching apparatus of claim 9 in operative association with the node server and the plurality of end nodes (fig. 6 and col. 4, line 61 to col. 5, line 32).

Regarding claim 17, the combination of Lee and Benhaddou discloses a communication network comprising a node server (fig. 3, element 25), a plurality of end nodes (fig. 3, elements right-side destinations 1 to N and subscribers), and a communication switch comprising the optical switching apparatus of claim 12 in operative association with the node server and the plurality of end nodes (fig. 6 and col. 4, line 61 to col. 5, line 32).

Response to Arguments

5. Applicant's arguments with respect to claims 1-3, 5-7, 9-13 and 15-17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.


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